

WHAT IS CLAIMED IS:

1. A communications system for a predetermined channel characteristic comprising:
  - means for outer encoding a data stream for error detection;
  - 5 means receiving the encoded data for determining if data to be transmitted by the system will likely be degraded by the channel characteristic;
  - means for adding redundancy to the data responsive to the determining means;
  - means for inner encoding the data with the added redundancy; and,
  - means for transmitting the data.
- 10 2. A communications system as defined in claim 1 wherein
  - the determining means comprises means for determining the trajectory of a sample relative to the prior and next samples;
  - the means for adding redundancy comprises a non-linear feed-back mechanism and variable input control mechanism; and
  - 15 the means for encoding the data with added redundancy is a convolutional encoder.
3. A communications system as defined in claim 1 wherein the determining means comprises a vulnerability table derived from a filter having the predetermined channel characteristic and receiving sample data and an XOR comparator receiving an output  
20 from the filter on a first input and the sample data on a second input.
4. A communications system as defined in claim 1 further comprising:
  - means for receiving the transmitted data;
  - means for decoding the inner encoded data connected to the receiving means;
  - means for assessing if the decoded data has added redundancy;
  - 25 means for compensating for the redundancy in the decoded data; and,
  - means for decoding the outer encoding for error correction.
5. A communications system as defined in claim 4 wherein the assessing means comprises a trajectory detection means.

6. A communications system as defined in claim 1 wherein the outer encoding means is a Reed Solomon encoder.

7. A communications system as defined in claim 4 wherein the means for decoding the inner encoded data is a Viterbi decoder.

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